# Air Quality Permitting
# Technical Memorandum

## Tier II Operating Permit and Permit to Construct No. 001-00190

**Western Electronics, Inc.**
**Meridian, Idaho**


**Prepared By:**

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**Permit Writer**

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**Project No. T2-000722**

**Date Prepared:**

**August 23, 2002**

**Permit Status:**

**FINAL PERMIT**

## LIST OF ACRONYMS

| | |
|---|---|
| acfm | actual cubic feet per minute |
| AFS | AIRS Facility Subsystem |
| AIRS | Aerometric Information Retrieval System |
| AQCR | Air Quality Control Region |
| BACT | Best Available Control Technology |
| CFR | Code of Federal Regulations |
| CO | carbon monoxide |
| Department | Department of Environmental Quality |
| DEQ | Department of Environmental Quality |
| dscf | dry standard cubic feet |
| EF | emission factor |
| EPA | Environmental Protection Agency |
| gpm | gallons per minute |
| gr | grain (1 lb = 7,000 grains) |
| HAPS | hazardous air pollutants |
| IDAPA | A numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act |
| km | kilometer |
| lb/day | pounds per day |
| lb/hr | pound per hour |
| lb/yr | pounds per year |
| MACT | Maximum Available Control Technology |
| MMBtu | million British thermal units |
| NESHAP | National Emission Standards For Hazardous Air Pollutants |
| $NO_2$ | nitrogen dioxide |
| $NO_X$ | nitrogen oxides |
| NSPS | New Source Performance Standards |
| O&M | Operations and Maintenance |
| $O_3$ | ozone |
| Pb | lead |
| PCB | printed circuit board |
| PM | particulate matter |
| $PM_{10}$ | particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers |
| ppm | parts per million |
| PSD | Prevention of Significant Deterioration |
| PTC | permit to construct |
| PTE | potential to emit |
| SCC | Source Classification Code |
| scf | standard cubic feet |
| SIC | Standard Industrial Classification |
| SIP | State Implementation Plan |
| Sn | tin |
| $SO_2$ | sulfur dioxide |
| T/yr | tons per year |
| Therms/mo | therms per month |
| Therms/yr | therms per year |
| TSP | total suspended particulates |
| UTM | universal transverse mercator |
| VOC | volatile organic compound |
| μm | micrometers |

## PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01 Sections 400-470 and 200-223, *Rules for the Control of Air Pollution in Idaho,* for Tier II operating permits.

## PROJECT DESCRIPTION

This project is for the issuance of a Tier II operating permit for Western Electronics located in Meridian Idaho. The emissions sources of the facility are: three re-flow ovens, two wave solder machines, and several natural gas fuel-burning units.

## FACILITY DESCRIPTION

Printed circuit boards (PCB) are manufactured by attaching electronic components to printed boards. During the manufacture of PCBs the boards move through a series of process steps. The boards require attachment of parts using solder paste. The part to be soldered using the paste is positioned on the paste and sent through a re-flow oven where the metallic components of the paste melt and the parts are attached. Other parts are fluxed and the board is passed over a fountain or wave, of liquid solder compound. The natural gas fuel-burning equipment provides a heat supply to make the solder molten and heat the building.

## SUMMARY OF EVENTS

| | |
|---|---|
| May 24,2001 | DEQ received an application for a Tier II permit from Western Electronics, Inc. |
| January 17, 2002 | The application was declared complete. |
| May 31, 2002 | A facility draft Tier II permit was issued for review. No facility comments received. |
| June 11 – July 10, 2002 | Public comment period was held. No comments were received. |

## DISCUSSION

1. Emission Estimates

The emission estimates as they were addressed in the application for lead were determined by using the lowest detectable limit. This would have required the facility to perform frequent source test on the various units to establish compliance. After a discussion with the facility official it was determined that monitoring would be the appropriate form of compliance determination with the permit. The emissions and requirements of this permit were based on the monitoring of the processes.

The particulate matter emissions were based on the worst-case scenario that flux from the paste when heated in the re-flow ovens is emitted to the atmosphere. This flux was assumed to have the composition of not more than 40% lead and 70% tin. The 40% and 70% were chosen to allow the facility flexibility in selecting the various paste and fluxes on the market. The wave solder machines use a different flux. The Vitronix wave solder machine uses a flux that is 75% isopropyl alcohol (isopropanol) while the Hollis wave solder machine uses a flux of 82% isopropanol. This would leave 25% and 18% of the flux used capable to be emitted to the atmosphere.

The emission estimates were based on these assumptions and the volumes of paste and flux used as stated in the facility's application.

Re-flow Ovens

Worst-case scenario would have the maximum lead (Pb) concentration not to exceed 40% and the maximum tin (Sn) concentration not to exceed 70 %. These percentages for each element's concentration is actually higher than the MSDS sheets presently indicate. The possible emission from each re-flow oven for each element is calculated by taking the total $PM_{10}$ divide it by 2% and multiplying by the corresponding percentage of each element.

Worst-case would be to assume all flux be $PM_{10}$ and become airborne. The following calculations indicate the maximum total flux used by one re-flow oven per day.

$0.006 in^3 / in^2$ of board surface X $35640 in^2$ of board surface / hour X 0.0307# / $in^3$ X 24 hours/day = 157.6#/day.

This is a conservative figure of flux used daily because the application states that only 65% of a board is covered with paste.

The amount of Pb and Sn used per day is determined as follows:

157.6 #/day X 2% X 3 reflow machines X 70% = 6.6 # of Sn / day or 6.6 #/day / 24 hr/day = 0.275 #/hr

157.6 #/day X 2% X 3 reflow machines X 40% = 3.78 # of Pb / day or 3.78 #/day / 24 hr/day = 0.1575 #/hr

The reviewed modeling for these stack parameter indicate that 4.75547 $ug/m^3$ of $PM_{10}$ is the air concentration for an emission rate 0.307 #/hr of $PM_{10}$ emission.

Determine the Sn ambient impact:

4.75547 $ug/m^3$ / 0.307 #/hr = X $ug/m^3$ / 0.275#/hr X = 4.26 ug /$m^3$ of Sn

4.26 $ug/m^3$ is less than the 100 ug/m3 stated in IDAPA 58.01.01.585. Therefore the concentration of Sn for the reflow ovens at 40 % of flux is below the AAC level for ambient impact.

Wave Solder Machines

Worst-case for the wave solder machines is to assume all $PM_{10}$ is emitted as Pb and Sn in the percentages of 40% and 70% respectively.

Vitronix wave machine

The flux used in the Vitronix wave solder machine is stated as having a non-isopropanol content of 25%.

0.5 gal/wk / 80 hr/wk X 7.09 #/gal X 25% = 0.0111 # $PM_{10}$ /hr

assume 70% of $PM_{10}$ to be Sn which equals 0.0777 # Sn/hr

assume 40 % of $PM_{10}$ to be Pb which equals 0.0444 # Pb/hr

Hollis wave machine

The flux used in the Hollis wave solder machine is stated as having a non-isopropanol content of 18%.

2.5 gal/wk / 80 hr/wk X 7.09 #/gal X 18 % = 0.0399 # $PM_{10}$/hr

assume 70% of PM10 to be Sn which equals 0.0279 # Sn/hr

assume 40 % of PM10 to be Pb which equals 0.016 # Pb/hr

Adding the quantity of Sn emitted for all units ( reflow ovens and wave machines)equals 0.275+0.0777+0.0279 = 0.3806 # Sn/hr.

Applying the Sn rate into the reviewed model:

4.75547 ug/$m^3$ / 0.307 #/hr = X ug/$m^3$ / 0.3806 #/hr X = 5.896 ug/$m^3$ < 100 ug/$m^3$ limit of IDAPA 58.01.01.585

The concentration of Sn for this project is well below the stated AAC limit of 100 ug/$m^3$ stated in IDAPA 58.01.01585. Therefore Sn models to be permitted at a concentration of less than 40 % Sn in wave solder machines fluxes and reflow ovens paste at the given usage stated within the permit.

Isopropanol has a limit stated in IDAPA 58.01.01.585. The remaining 75% of Vitronix flux and 82% of Hollis flux was stated to be isopropanol. A review of each wave solder flux indicated the hourly usage is 0.033 #/hr and 0.182 #/hr respectively.

Applying the isopropanol rate in to the reviewed model

Total isopropanol emitted to atmosphere: 0.033 #/hr + 0.182 #/hr = 0.215 #/hr

4.75547 ug/$m^3$ / 0.307 #/hr = X ug/$m^3$ / 0.251 #/hr X = 3.89 ug/$m^3$

The AAC level stated for isopropanol in IDAPA 58.01.01.585 is 49 ug/$m^3$. The facility emits a level of isopropanol that is well below the screening level stated in IDAPA 58.01.01.585.

2. Modeling

The facility consultant, Cameron Holgate, performed the modeling submitted in the facility's application. Department staff reviewed this modeling and the memorandum of this review can be found in the Appendix of this memorandum. The Department approved the results of the application's modeling and it was this model of $PM_{10}$ that established the emission estimates and concentrations to the atmosphere for the worst-case scenario stated in the emission estimate section of this memorandum.

3. Area Classification

Western Electronics, Inc., is located in Ada county, which is part of AQCR 64. This area is classified as nonattainment for CO and attainment or unclassifiable for all other federal and state criteria air pollutants (i.e., $PM_{10}$ $NO_x$, $SO_2$).

4. Facility Classification

The facility is not a designated facility as defined in IDAPA 58.01.01.006.25. The AIRS facility classification is a "B", which is defined as a source with actual and potential emissions of any criteria pollutant less than 100 T/yr.

## 5. Permit Condition Review

The Department has determined that Western Construction constructed without first obtaining the required Permit to Construct. This permit is therefore both a Tier II Operating Permit and Permit to Construct.

In Section 2 are the facility-wide conditions that are not address to any specific emission unit elsewhere in the permit. The conditions stated in the facility-wide section effect the facility as a whole, as well as any permitted or not permitted emission unit at the facility. The facility-wide conditions provide the address for any reports required to be mailed to the Department.

The first two conditions of Section 3, Section 4, Section 5 and Section 6 are self-explanatory.

Section 3 involves the requirements for the reflow ovens.

| Condition | Purpose for the condition |
|---|---|
| 3.3 | The emission rate limit for $PM_{10}$ is based on the evaluation of each reflow oven.<br><br>This limit of Pb is based on the worst-case scenario that all flux in the paste will be emitted to the air and that 40% of this flux is Pb. This establishes the maximum limit of Pb emissions from each reflow oven. The present MSDS sheet s indicated the maximum Pb content is less than 30%. This would indicate the current emission of Pb from each reflow oven is far less than the daily emission stated in the permit. But the limit of Pb emission at 1.26 #/day does meet the NAAQS and allows the facility to be flexible in the paste purchases for its processes.<br><br>This limit of Sn is based on the worst-case scenario that all flux in the paste will be emitted to the air and that 70% of this flux is Sn. This establishes the maximum limit of Sn emissions from each reflow oven. The present MSDS sheet s indicated the maximum Sn content is less than 60%. This would indicate the current emission of Sn from each reflow oven is far less than the daily emission stated in the permit. But the limit of Sn emission at 2.2 lb/day does meet the NAAQS and allows the facility to be flexible in the paste purchases for its processes. |
| 3.4 | This limit is established for ease of monitoring and because it set the basis for the limits set in Permit Condition 3.3. By knowing the amount of paste used and the percentage of paste that is flux, the calculations of Pb and Sn emissions can be determined. |
| 3.5 | The percentage that could volatize from the paste was stated in the application to be 2%. The condition is needed to correlate with the amount of paste the maximum emission possible of Sn and Pb. If the percentage of volatilization were greater than 2% then the emissions of Pb and Sn could exceed those stated in the permit. |
| 3.6 | The solder paste composition is an operating requirement because it is these maximum concentrations that determine if the NAAQS standards are met to be permitted and the facility's flexibility in purchases of the material needed for its processes. |
| 3.7 | Documentation has been acquired by the Department that indicates if Pb-Sn solder were melted at a temperature of less that 600°F (306°C) the vaporization of Pb and Sn from the solder are negligible. Thus the limit was established to operate below this given temperature to minimize any additional Pb and Sn emissions from the process. |

3.8 The monitoring condition is designed to establish the facility is operating in the guidelines set by this permit, and allows the facility the operational flexibility to purchase material needed that could be of a different Pb-Sn composition. This condition could be met by having on file the MSDS sheet for material delivered at the facility. This condition has the facility recording the actual amount of solder paste used per each reflow oven. This condition explains in what units the throughput used in the reflow ovens are to be recorded. This condition makes it easy for both the facility and the Department to determine the facility is operating in compliance with the Tier II operating permit.

3.9 The monitoring condition is designed to establish the facility is operating in the guidelines set by this permit. In addition, this condition assists the Department in determining the facility's compliance status. The application states the amount of paste used as it is related to the board panels produced. This condition explains in what units the throughput used in the reflow ovens are to be recorded. This condition makes it easy for both the facility and the Department to determine the facility is operating in compliance with the Tier II operating permit.

3.10 The monitoring condition is designed to establish the facility is operating in the guidelines set by this permit, and allows the facility the operational flexibility to purchase material needed that could be of a different Pb-Sn composition. This condition could be met by having on file the MSDS sheet for material delivered at the facility. This condition has the facility recording the actual amounts of Pb, Sn, and non-volatile contents in the solder paste used. This condition makes it easy for both the facility and the Department to determine the facility is operating in compliance with the Tier II operating permit.

3.11 This monitoring condition is designed to establish the facility's Pb and Sn emissions are being generated from the solder paste and flux and not from high temperature melting of the solder.

3.12 This condition is established for the facility through its own experience of its equipment and operation to put in writing the procedures the facility's personnel will follow to assure compliance with each condition stated in the Tier II operating Permit.

<u>Vitronix and Hollis Wave Solder Machines</u>

4.3 This condition is based on the evaluation of the activities of Vitronix wave solder machine in a tabular form. It is primarily a summation of calculations based on the limitations stated in other conditions.

<u>Vitronix Wave Solder Machine</u>

This limit of Pb is based on the worst-case scenario that all nonisopropanal material in the flux will be emitted to the air and that 40% of this flux is Pb. This establishes the maximum limit of Pb emissions from the Vitronix wave solder machine. The present MSDS sheets indicate the maximum nonisopropanol material content is 25% by weight. This would indicate the current emission of Pb from the Vitronix wave solder machine of 0.0107 #/day meets the NAAQS and allows the facility flexibility to purchase fluxes less than 25% nonisopropanol material for its processes.

This limit of Sn is based on the worst-case scenario that all nonisopropanal material in the flux will be emitted to the air and that 70% of this flux is Sn. This establishes the maximum limit of Sn emissions from the Vitronix wave solder machine. The present MSDS sheet s indicate the maximum nonisopropanol material content is 25% by weight. This would indicate the current emission of Sn from the Vitronix wave solder machine of 0.1865 #/day meets the NAAQS and allows the facility flexibility to purchase fluxes of less than 25% nonisopropanol material for its processes.

Hollis Wave Solder Machine

This limit of Pb is based on the worst-case scenario that all nonisopropanal material in the flux will be emitted to the air and that 40% of this flux is Pb. This establishes the maximum limit of Pb emissions from the Hollis wave solder machine. The present MSDS sheet s indicate the maximum nonisopropanol material content is 18% by weight. This would indicate the current emission of Pb from the Hollis wave solder machine at 0.384 #/day meets the NAAQS and allows the facility to be flexible to purchase fluxes of less than 18% nonisopropanol material for its processes.

This limit of Sn is based on the worst-case scenario that all nonisopropanal material in the flux will be emitted to the air and that 70% of this flux is Sn. This establishes the maximum limit of Sn emissions from the Hollis wave solder machine. The present MSDS sheet s indicate the maximum nonisopropanol material content is 18% by weight. This would indicate the current emission of Sn from the Hollis wave solder machine at 0.6703 #/day meets the NAAQS and allows the facility to be flexible to purchase fluxes of less than 18% nonisopropanol material for its processes.

4.4 This limit is established for ease of monitoring and because it sets the basis for the limits in condition 4.3 for the Vitronix wave solder machine. By knowing the amount of flux used and the percentage of flux that is non-ispopropanol material, the calculations of Pb and Sn emission can be determined.

4.5 Ibid 4.4, but for the Hollis wave solder machine.

4.6 The solder paste composition is an operating requirement because it is these maximum concentrations that determines if the NAAQS standards are met to be permitted and the facility's flexibility in purchases of the material needed for its processes.

4.7 Vitronix Wave Solder Machine

The application stated the percentage that could volatize from the flux is between 75 to 90%. This condition is needed to correlate with the amount of nonisopropanol material to maximize the emission possibility of Sn and Pb. If the percentage of volatilization of isopropanol were less than 75% than the emission limits of Pb and Sn could exceed those stated in the permit.

Hollis Wave Solder Machine

The percentage that could volatize from the flux was stated in the application to be 82%. The condition is needed to correlate with the amount of nonisopropanol material to maximize the emission possibility of Sn and Pb. If the percentage of volatilization of isopropanol were less than 82% than the emission limits of Pb and Sn could exceed those stated in the permit.

The flux composition is an operating requirement because it is the maximum concentrations that determines if the NAAQS standards are met to allow permitting and the facility's flexibility in purchasing the flux needed for its processes.

4.8 This monitoring condition is designed to establish the facility's Pb and Sn emissions are being generated from the solder paste and flux and not from high temperature melting of the solder.

4.9 The monitoring condition is designed to establish the facility is operating in the guidelines set by this permit, and allows the facility the operational flexibility to purchase material needed that could be of a different Pb-Sn composition. This condition could be met by having on file the MSDS sheet for material delivered at the facility. This condition has the facility recording the actual amounts of solder paste or flux used. This condition explains in what units the throughput used are to be recorded. This condition makes it easy for both the facility and the Department to determine the facility is operating in compliance with the Tier II operating permit.

4.10 The monitoring condition is designed to establish the facility is operating in the guidelines set by this permit, and allows the facility the operational flexibility to purchase material needed that could be of a different Pb-Sn composition. This condition could be met by having on file the MSDS sheet for material delivered at the facility. This condition has the facility recording the actual amount of Pb, Sn, and non-volatile content in the solder paste or flux used. This condition makes it easy for both the facility and the Department to determine the facility is operating in compliance with the Tier II operating permit.

4.11 This condition is established for the facility through its own experience of its equipment and operation to put in writing the procedures the facility's personnel will follow to assure compliance with each condition stated in the Tier II operating Permit.

<u>Fuel Burning Equipment</u>

5.3 This condition is based on the evaluation of the natural gas burning equipment's activities in a tabular form. It is primarily a summation of calculations based on the limitations stated in other conditions.

5.4 The restriction is for natural gas burning only. This because the application did not indicated any other fuel to be burned.

5.5 The throughput limitation allows those units at the facility to operate at their maximum capacity. In addition the facility has the flexibility over the five-year permit to change units and still stay within the fuel usage limit of this permit.

5.6 The natural gas providers usually charge their customers for the therms or cubic feet of gas used. This condition provides the facility with easy monitoring that is in correlation with the permit.

5.7 This condition is established for the facility through its own experience of its equipment and operation to put in writing the procedures the facility's personnel will follow to assure compliance with each condition stated in the Tier II operating Permit.

## 6. AIRS

### AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

| AIR PROGRAM / POLLUTANT | SIP | PSD | NSPS (Part 60) | NESHAP (Part 61) | MACT (Part 63) | TITLE V | AREA CLASSIFICATION A = Attainment U = Unclassifiable N = Nonattainment |
|---|---|---|---|---|---|---|---|
| $SO_2$ [h] | B | | | | | | Unclassifiable |
| $No_x$ [i] | B | | | | | | Unclassifiable |
| CO [j] | B | | | | | | Nonattainment |
| $PM_{10}$ [k] | B | | | | | | Unclassifiable |
| PT (Particulate) [l] | B | | | | | | Unclassifiable |
| VOC [m] | B | | | | | | Unclassifiable |
| THAP (Total HAPs) [n] | | | | | | | |
| | | | APPLICABLE SUBPART | | | | |
| | | | | | | | |

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

- A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For NESHAP only, class "A" is applied to each pollutant which is below the 10 T/yr threshold, but which contributes to a plant total in excess of 25 T/yr of all NESHAP pollutants.
- SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.
- B = Actual and potential emissions below all applicable major source thresholds.
- C = Class is unknown.
- ND = Major source thresholds are not defined (e.g., radionuclides).

[c] State Implementation Plan
[d] Prevention of Significant Deterioration
[e] New Source Performance Standards
[f] National Emission Standards for Hazardous Air Pollutants
[g] Maximum Achievable Control Technology
[h] Sulfur Dioxide
[i] Nitrogen Oxides
[j] Carbon Monoxide
[k] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[l] Particulate Matter
[m] Volatile Organic Compounds
[n] Hazardous Air Pollutants

## FEES

Fees apply to this facility in accordance with IDAPA 58.01.01.470. The facility is subject to permit application fees for this revised Tier II operating permit of $500. This permit action is not subject to the new fee requirements contained in IDAPA 58.01.01.224 or IDAPA 58.01.01.407, which became effective July 1, 2002, because the permit has been in process at the Department since May 2001.

## RECOMMENDATIONS

Based on the review of the application materials, and all applicable state and federal regulations, staff recommends that DEQ issue a Tier II operating permit and Permit to Construct to Western Electronics, Inc. An opportunity for public comment on the air quality aspects of the operating permit was provided in accordance with IDAPA 58.01.01.404.01.c..

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cc: Joan Lechtenberg, Air Quality Division
Matt Stoll, Boise Regional Office
Sherry Davis, Technical Services Division

# APPENDIX

# MODELING ANALYSIS

# WESTERN ELECTRONICS, INC.
## MERIDIAN, IDAHO
## ISCST3 Dispersion Modeling Discussion

Source Emission Inventory

This dispersion modeling was performed for Western Electronics, Inc. for inclusion in its Application For A Permit To Construct a New Facility. The model used is ISCST3, and plan maps showing model receptor locations are included.

The five emission sources modeled are comprised of three re-flow ovens and two wave solder machines and are classified as point sources.

Lead and solder flux substances are emitted from the sources and are modeled separately as $PM_{10}$. The reason for this approach was so the lead concentration could be estimated to check its compliance with the 1.5 μg/m$^3$ requirement under 58.01.01.577.07.

The solder flux material is not known to contain any toxic or criteria substances so was modeled as $PM_{10}$ and found to be less than 5 μg/m$^3$ when proper stack design criteria are followed.

Following are the emission estimates in pounds per hour and tons per year, and significant level from IDAPA 58.01.01.006.92.vi:

| LEAD AS PARTICULATE | Lbs./Hr. | PTE Tons/Yr | Significant Tons/Yr |
|---|---|---|---|
| Vitronix Re-flow oven | 4.50e-5 | 1.97e-4 | |
| Vitronix Wave Solder | 1.35e-4 | 5.91e-4 | |
| Heller Re-flow oven | 4.50e-5 | 1.97e-4 | |
| Vitronix Re-flow oven | 4.50e-5 | 1.97e-4 | |
| Hollis Wave Solder | 1.35e-4 | 5.91e-4 | |
| **TOTALS** | 4.05e-4 | 1.77e-3 | 0.6 (Facility) |

| FLUX AS PARTICULATE | | | |
|---|---|---|---|
| | Lbs./Hr. | Tons/Yr | Significant Tons/Yr |
| Vitronix Re-flow oven | 8.53e-2 | 3.74e-1 | |
| Vitronix Wave Solder | 1.11e-2 | 4.86e-2 | |
| Heller Re-flow oven | 8.53e-2 | 3.74e-1 | |
| Vitronix Re-flow oven | 8.53e-2 | 3.74e-1 | |
| Hollis Wave Solder | 3.99e-2 | 1.75e-1 | |
| **TOTALS** | 3.07 e-1 | 1.35 | 15 (Facility) |

The following point source parameters were used for developing the model:

| STACK PARAMETERS | | | | |
|---|---|---|---|---|
| **Process Equipment and Stack Number** | Stack Height (m) | Stack Diameter (m) | Stack Temperature (K) | Stack Velocity (m/s) |
| Vitronix Re-flow oven (#1) | 13.5 | 0.2722 | 311 | 4.06 |
| Vitronix Wave Solder (#2) | 12.5 | 0.2722 | 311 | 12.2 |
| Heller Re-flow oven (#3) | 13.5 | 0.2722 | 311 | 4.06 |
| Vitronix Re-flow oven (#4) | 13.5 | 0.2722 | 311 | 4.06 |
| Hollis Wave Solder (#5) | 11.0 | 0.2722 | 311 | 12.2 |

Source's Environment Description

Maps showing property lines and model receptors are included.

The Western Electronics plant is located on fairly flat terrain with no terrain features above the stacks.

Modeling Methodology

Meteorological data for modeling the Western Electronics plant was provided by IDEQ. The data is for Boise, Idaho.

Receptors for the modeling were located approximately 165 feet (50 meters) apart on the property boundary. Receptors for the broader regional assessment were placed 100

<u>meters apart in a grid that is 2400 meters by 2400 meters. This array provides good coverage for approximately 1000 meters on all sides of the plant.</u>

<u>Modeling Results</u>

The results of the Western Electronics modeling show that the second high 24 hour average concentration for lead is 0.00566 $\mu g/m^3$ in 1989, the highest year. The five years modeled are 1987 through 1991.

The highest annual average concentration for the five year period (1987 through 1991), was 0.00142 $\mu g/m^3$ in 1991.

Solder flux was also modeled as particulate and its highest second high 24 hour average concentration is 4.75547 $\mu g/m^3$ in 1989.

The highest annual average concentration for the five year period (1987 through 1991), was 1.21616 $\mu g/m^3$ in 1991.

The above modeling results were based on emissions that would result from processing 35,640 square inches per hour of printed circuit boards through each machine.

# ISCST3 DISPERSION MODELING ANALYSIS

| | |
|---|---|
| Company Name: Western Electronics, Inc. | Date Created: ####### |
| Mailing Address: | Last Modified: |
| City/State, Zip: | Modeler: Cam Houlgate |

## Equipment Modeled

Units

| | |
|---|---|
| Equipment Type: Re-flow ovens and Wave solder machines | Rated Capacity: 35,640 sq. in. boards/hr per line. |
| Manufacturer: Various | Stack Hight: 11.0m, 12.5m, and 13.5m |
| Model Number: See accompanying sheets | Stack Diameter: 0.2722m |
| Description: Tin-lead soldering machines for Printed Circuit Board mfg. | Volumetric Flowrate: See accompanying sheets |
| | Stack Temperature: 311 Kelvin, all stacks |

## ISCST3 Results (background included)

| | | | |
|---|---|---|---|
| 2nd highest 24-hr average: | 0.00566 | High Average Annual Concentration: | 0.00142 |

## Operating Conditions

| | | |
|---|---|---|
| Operating Hours: | 8,760 Hrs/Yr<br>24 Hrs/Day | Modeling Period: 1987, 1988, 1989, 1990, & 1991 |

## Emission Calculations

| LEAD<br>Source | Emission Rate lb/hr | Emission Rate ton/yr | Significant Standard ton/yr | Significant? |
|---|---|---|---|---|
| Stack #1 | 4.50E-05 | 1.97E-04 | | |
| Stack#2 | 1.35E-04 | 5.91E-04 | | |
| Stack #3 | 4.50E-05 | 1.97E-04 | | |
| Stack #4 | 4.50E-05 | 1.97E-04 | | |
| Stack #5 | 1.35E-04 | 5.91E-04 | 0.6 Facility | NO |

## Receptor Impact Calculations

| LEAD<br>Source | Emission Rate lb/hr | High 2nd 24-hr High ug/m3 | High Annual Avg. Max. ug/m3 |
|---|---|---|---|
| Stack #1 | 4.50E-05 | | |
| Stack#2 | 1.35E-04 | | |
| Stack #3 | 4.50E-05 | | |
| Stack #4 | 4.50E-05 | | |
| Stack #5 | 1.35E-04 | | |
| Facility Total | 4.05E-04 | 0.00566 | 0.00142 |

# ISCST3 DISPERSION MODELING ANALYSIS

**Ambient Air Quality Background Concentration for Pollutants above Significant Contribution Levels**

| County: Ada | Background | Background |
|---|---|---|
| Pollutant: Lead | 24-hr Avg. | Annual Avg. |
| Source | ug/m3 | ug/m3 |
| Stack #1 | | |
| Stack#2 | | |
| Stack #3 | | |
| Stack #4 | | |
| Stack 5 | | |
| Facility Total | No significant contribution for this facility | |

**Ambient Impacts Including Background Concentrations for Pollutants above Significant Contribution Levels**

| Pollutant: | Concentration | Concentration |
|---|---|---|
| | 24-hr Avg. | Annual Avg. |
| Source | ug/m3 | ug/m3 |
| | No significant contribution for this facility | |

# ISCST3 DISPERSION MODELING ANALYSIS

| | |
|---|---|
| Company Name: Western Electronics, Inc. | Date Created: November 17. 2000 |
| Mailing Address: | Last Modified: |
| City/State, Zip: | Modeler: Cam Houlgate |

## Equipment Modeled

Units

| | |
|---|---|
| Equipment Type: Re-flow ovens and Wave solder machines | Rated Capacity: 35,640 sq. in. boards/hr per line. |
| Manufacturer: Various | Stack Hight: 11.0m, 12.5m, and 13.5m |
| Model Number: See accompanying sheets | Stack Diameter: 0.2722m |
| Description: Tin-lead soldering machines for Printed Circuit Board mfg. | Volumetric Flowrate: See accompanying sheets |
| | Stack Temperature: 311 Kelvin, all stacks |

## ISCST3 Results (background included)

| | | | |
|---|---|---|---|
| 2nd highest 24-hr average: | 4.75547 | High Average Annual Concentration: | 1.21616 |

## Operating Conditions

| | |
|---|---|
| Operating Hours: | 8,760 Hours/Yr<br>24 Hours/Day |

Modeling Period: 1987, 1988, 1989, 1990, & 1991

## Emission Calculations

| FLUX AS PM10<br>Source | Emission Rate lb/hr | Emission Rate ton/yr | Significant Standard ton/yr | Significant? |
|---|---|---|---|---|
| Stack #1 | 8.53E-02 | 3.74E-01 | | |
| Stack#2 | 1.11E-02 | 4.86E-02 | | |
| Stack #3 | 8.53E-02 | 3.74E-01 | | |
| Stack #4 | 8.53E-02 | 3.74E-01 | | |
| Stack #5 | 3.99E-02 | 1.75E-01 | 1.5 Facility | NO |

## Receptor Impact Calculations

| FLUX AS PM10<br>Source | Emission Rate lb/hr | High 2nd 24-hr High ug/m3 | High Annual Avg. Max. ug/m3 |
|---|---|---|---|
| Stack #1 | 8.53E-02 | | |
| Stack#2 | 1.11E-02 | | |
| Stack #3 | 8.53E-02 | | |
| Stack #4 | 8.53E-02 | | |
| Stack #5 | 3.99E-02 | | |
| Facility Total | 3.07E-01 | 4.75547 | 1.21616 |

# ISCST3 DISPERSION MODELING ANALYSIS

**Ambient Air Quality Background Concentration for Pollutants above Significant Contribution Levels**

| County: Ada<br>Pollutant: Lead<br>Source | Background<br>24-hr Avg.<br>ug/m3 | Background<br>Annual Avg.<br>ug/m3 |
|---|---|---|
| Stack #1 | | |
| Stack#2 | | |
| Stack #3 | | |
| Stack #4 | | |
| Stack 5 | | |
| Facility Total | No significant contribution for this facility | |

**Ambient Impacts Including Background Concentrations for Pollutants above Significant Contribution Levels**

| Pollutant:<br>Source | Concentration<br>24-hr Avg.<br>ug/m3 | Concentration<br>Annual Avg.<br>ug/m3 |
|---|---|---|
| No significant contribution for this facility | | |